

**LOGISTICS MANAGEMENT SYSTEM AND SERVICE QUALITY FOR DRY
FOOD RATION IN UGANDA POLICE FORCE**

BY

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13/U/2057/GMSC/PE

**A DISSERTATION SUBMITTED TO GRADUATE SCHOOL IN PARTIAL
FULFILMENT OF THE
REQUIREMENT FOR THE AWARD OF MASTERS
OF SCIENCE IN SUPPLYCHAIN MANAGEMENT
OF KYAMBOGO UNIVERSITY**

JANUARY, 2016

DECLARATION

I, Masturah Kugonzahereby declare that this dissertation is my original work and has never been submitted for any academic award or publication in any institution or University. Due acknowledgement has been made for the work of others in this report, through quotation and references.

Signed 

Masturah Kugonza

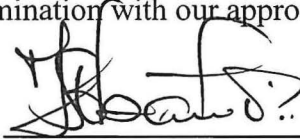
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APPROVAL

This is to certify that this dissertation entitled “**LOGISTICS MANAGEMENT SYSTEM AND SERVICE QUALITY FOR DRY FOOD RATION IN UGANDA POLICE FORCE**” was conducted under our supervision. Its final report is now being submitted to Uganda Kyambogo University for examination with our approval.



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Dr. Peter Obanda

Date: 25/01/2016

Date: 25/01/2016.

DEDICATION

This work is dedicated to my family.

ACKNOWLEDGEMENT

I would like to express my thanks and gratitude to various people who contributed to the completion of this work. I wish to express my sincere gratitude to my supervisors DR. Charles Ndandiko and Dr. Peter Obanda for their profound efforts to supervise this thesis. I extend special thanks to the management and staff of Uganda Police Logistics and Stores team for accepting to respond to this study with commitment and make it successful.

I want in a special way, to thank my Husband for the encouragement and moral support that enabled me accomplish this Thesis. To my children this is an inspiration for you to achieve more.

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ABBREVIATIONS AND ACRONYMS

CR	:	Continuous Replenishment
CVI	:	Content Validity Index
ECR	:	Efficient Consumer Response
EDI	:	Electronic Data Input
EOQ	:	Economic Order Quantity
ICT	:	Information and Communication Technology
JIT	:	Just in Time
LSQ	:	Logistics Service Quality
POS	:	Point of sale
QR	:	Quick Response
UPF	:	Uganda Police Force

ABSTRACT

The purpose of the study was to assess the relationship between logistics management system and service quality for dry food ration in Uganda Police Force. The objectives of the study were to examine the relationship between logistics services, inventory management, logistics communication and service quality for dry food ration at Uganda Police. The study used a cross sectional research design using both quantitative and qualitative approaches. Data was collected from a sample of 80 logistics team comprising of logistics, stores and receiving committees. The study found that the prevailing transport, storage and distribution services adversely affected the timeliness, availability and condition of dry food rations at UPF. It was also found that the use of fixed order quantity in inventory management constrained the timeliness, availability and condition of dry food rations in UPF. The study also found that although internal communication was good, the failure to use modern ICT adversely affected LSQ in the UPF. The study concluded that dry food rations service quality significantly depends on logistics services of transport, storage and last mile distribution. It was also concluded that dry food rations service quality significantly depends on appropriate consideration of inventory system and replenishment methods. The study concluded that LSQ in UPF depends on internal communication and use of modern ICT. To enhance the timeliness, availability and condition of dry food rations in the UPF the study recommends that the management of UPF should increase on the logistics budget to enable it acquire a dedicated fleet and construction of stores. Management should also develop multiple inventory system which provide for JIT inventory supply quick response, efficient customer response, continuous replenishment and vendor managed inventory methods. The management of UPF should use EDI, radio frequency, internet and website for online communication.

CHAPTER ONE

INTRODUCTION

1.1. Introduction

The study examines the relationship between logistics management system in Uganda Police force and service quality for dry food ration. This chapter presents the background to the study, statement of the problem, objectives of the study, study hypotheses, scope of the study, significance and justification of the study.

1.2. Background of the Study

History has it that from the times of Roman Empire, the Crusades, Napoleon, and the American Civil War, it is still true today that armed forces operations highly depended on the quality of logistics services. This is true to the extent that the ability to transport, feed, arm, and fuel a force in the field is vital for strategic, operational, and tactical tasks in military and police forces (Council of Logistics Management, 1998; Jonsson, 2008).

Chang (1998) explores the historical developments of modern day logistics management and how they have influenced logistics services and classifies it into four phases. The first stage that dates from the industrial revolutions up to the 1950 called the dormant stage was characterized by the logistics acting as a back office activity concerned with inbound goods for production. The second stage called the development stage spanning 1960s to 1970s was characterized by applying administrative management theories related to planning, organizing, coordination and control following realization of logistics as a strategic function. The takeoff years 1980-1990s, logistics management increasingly focused on the strategic role of logistics with emphasis placed on logistics service quality to gain competitive

advantage. The final stage integration stage attributed to the 21st century saw logistics being integrated in the organizational processes as a strategic function necessary to attain competitive advantage through enhance service quality.

Forslund (2007) notes that although it is widely recognized that the logistics management system makes it possible or impossible to achieve organisations operations, attaining the desired logistics service quality evident in timeliness, availability and condition of suppliers has been a problem in the past and today.

In Uganda, the logistics function dates back to the times when the Police Tender Board was created by The Police Statute No. 3 of 1994 to procure goods works and services for the police force (Agaba& Shipman, 2006). However, unlike its sister force, in the military, the logistics function has in UPF persistently manifested service level gaps due to poor funding constraining the logistics services, inventory management and communication in the logistics function.

The Situation report on logistics stores (2014) for example reveal delayed delivery of goods, poor inventory management characterized with increased inventory costs, under-stocking and overstocking of items like posho and beans in far flung areas like mount Moroto region, Kalangala and Kanungu. The report equally notes a communication challenge due lack of modern ICT infrastructure necessary for logistics operations.

With increasing demand of police services due to creation of more administrative units and population growth, the logistics function in UPF will experience an increasing demand of logistics against limited resources. This necessitated examining the logistics management system in the force for enhanced logistics service quality and contributes to the overall achievement of the UPF's mandate.

1.3. Statement of the Problem

The UPF has put in place a logistics function charged with offering transport, storage, and distribution of consumables as well as their replenishment countrywide. To affect this function, the logistics function relies on internal communication using communication equipment. Despite the establishment and strengthening of the logistics function in the force, the logistics service quality in UPF leaves a lot to be desired and seems to constrain police operations. For example, the force has noted increasing cases of late deliveries of dry food rations to the police posts and outposts as well as bad food supplies with remote districts experiencing stock outs leaving some officers to work on empty stomachs and suspending of police operations (Situation report on logistics stores, 2014). Although the logistics service quality gaps may be attributed to other factors such as procurement and budgets, this study was interested in examining the extent to which the logistics management system has influenced logistics service quality in UPF given its vital role of transportation, storage, distribution of goods and information in the force.

1.4. Purpose of the Study

To assess the relationship between logistics management system and service quality for dry food ration in Uganda Police Force.

1.5. Objectives of the Study

- i. To examine the relationship between logistics services and service quality for dry food ration at Uganda Police
- ii. To assess the relationship between inventory management and service quality for dry food ration at Uganda Police
- iii. To establish the relationship between logistics communication and service quality for dry food ration at Uganda Police

1.6. Study Hypotheses

- i. H₁. There is a significant relationship between Logistics services and service quality for dry food ration in Uganda Police.
- ii. H₂. There is a significant relationship between inventory management and service quality for dry food ration in Uganda Police.
- iii. H₃. There is a significant relationship between logistics communication and service quality for dry food ration in Uganda Police.

1.7. Scope of the Study

1.7.1. Content Scope

The study concentrated on logistics management systems as the independent variable under the dimensions of logistics services (transport, storage and distribution); inventory management (inventory system and replenishment approach) and communication (internal and use of ICT). The study also considered Logistics service quality as the dependent variable under the indicators of timeliness, availability and condition of goods.

1.7.2. Geographical scope

The study was carried out in all Uganda police force in the different regions country wide for purposes of accessing the logistics service quality perceptions by the user/receipts of dry food rations.

1.7.3. Time scope

The study considered the period June 2013- June 2015 the time when UPF experienced challenges in logistics management of especially in dry food rations.

1.8. Significance of the Study

- i. The results from the study helped UPF logistics function and other stake holders come up with managerial policies that will help improve on their

effective and efficiency delivery of services at a minimum cost possible and satisfaction of users.

- ii. The study helped the researcher obtain a broader understanding of logistics systems and service delivery.
- iii. The findings obtained from the study added on the existing related literature to be used by various academicians for further research conducted on this topic and other related issues.

1.9. Justification of the Study

With the increasing creation of administrative units in the country, the role of police is increasingly becoming significant. Effective policing by the UPF is highly dependent on availability of logistics necessary for police operations. To this effect, how well the logistics service, inventory and communications are managed in the logistics functions are instrumental in availability of policing logistics. However, UPF has persistently experienced challenges in the management of its logistics function in areas of logistics service, inventory and communications especially in dry foods rations required countrywide. There was need for empirical recommendations from a systematic study to cause management of the force to strengthen the food logistics management. This study was conceived to generate managerial policy recommendations for enhanced dry food rations service quality in the UPF.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter presents a review of related literature on logistics management and logistics service quality based on what other scholars have observed and opined world over. The first section presents the theoretical review. This is followed by the conceptual review, a review of related literature in relation to the objectives, the conceptual framework and summary of the literature review.

2.2. Theoretical Review

The study was underpinned by is the Wilson (1934) Economic Order Quantity (EOQ) model or the order size for inventory that minimizes total inventory cost. The basic EOQ model assumes that items are removed from inventory at a constant rate (S), and that it costs the firm (C) to carry a unit of inventory for one period. The firm incurs a fixed reordering cost (F) per order that is independent of the number of items reordered. With constant inventory usage and instantaneous inventory replacement, the inventory levels under an EOQ model follow the saw tooth pattern. The initial inventory level of Q falls at a constant rate to zero is instantaneously replenished back to Q , and then repeats the same decline. The number of orders per year (S/Q) is total sales divided by the quantity ordered in units per period. The total annual costs are equal to the ordering costs plus carrying costs. The ordering costs are the costs per

order (F) times the number of orders per year (S/Q). The total annual carrying costs C ($Q/2$), which is the carrying cost per unit (C) times the average inventory level ($Q/2$).

$$\text{Total costs} = \text{Ordering costs} + \text{Carrying costs} = F \left[\frac{S}{Q} \right] + C \left[\frac{Q}{2} \right]$$

Where C is the carrying cost per unit for the period; Q is the quantity ordered in units per order; S is the total sales or usage in units for the period; and F is the fixed ordering cost per order. Increasing Q increases the carrying costs but decreases the ordering costs. Thus, achieving a minimum total cost requires finding the order quantity that balances these component costs. The order quantity that minimizes total costs is the economic order quantity (EOQ).

The formula for determining EOQ is:

$$\text{EOQ} = \sqrt{2FS/C}$$

An assumption of the EOQ model is that firms let inventory levels fall to zero before they reorder. Most firms cannot allow inventory to decline to zero without losing sales due to stock outs. Firms typically establish a minimum level of inventory, known as a safety stock, to prevent losing sales due to stock outs. Assuming immediate delivery of inventory upon reordering, firms would reorder inventory whenever the inventory level falls to the safety stock level. To allow for delivery time, most firms will need to reorder inventory before the inventory level reaches the critical safety stock level. The reorder points represent the times when the firm will actually place its inventory order. Two factors determine the reorder points (1) the pace of inventory depletion and (2) the length of time for inventory delivery after placing the order.

One of the major criticisms of the EOQ approach is that it assumes a fixed and exogenously determined market demand rate, which is not often static and predictable

especially for construction projects. Never the less, the EOQ model will guide this study in examining the inventory management system under the indicators of inventory system and replenishment approaches used by the UPF and how they influence logistics services and overall logistics service quality in the force.

The study was also underpinned by the Service quality (SERVQUAL) model proposed by Parasuraman et al. (1988) which asserts that service quality has five dimensions tangibility, empathy, reliability, assurance and responsiveness. Tangibility of a service focuses on an evaluation of the physical facilities, appearance of personnel, tools or equipment used to provide service; reliability examines the ability to perform the promised service dependably and accurately; responsiveness focuses on the willingness to help and provide prompt service, responding immediately to request and solving site problems; assurance focuses on the skill, knowledge and courtesy of service providers and the level of confidence that they convey while delivering the service; empathy focuses on the care and personalized attention the firm provides for its customers.

Service quality therefore is a measure of how well a delivered service matches the customers' expectations and the main reason to focus on quality is to meet customer needs while remaining economically competitive in the same time (Parasuraman et al., 1988). The SERVI-QUAL model therefore underpins this study as it suggests a key variable of service quality which is the dependent variable in this study. The model also suggests the need to evaluate the internal and outsourced partner's service quality in terms of tangibility, reliability, responsiveness, assurance and empathy in offering logistics services to parties in the contract. The Parasuraman et al., (1988) service quality therefore suggests the need to assess the logistics services on the

extent to which they meet the tangibility, reliability, responsiveness, assurance and empathy aspects of the service with a physical distribution perspective.

2.3. Conceptual Review

2.3.1. Logistics management

Lyson and Farrigham (2009) define logistics management as a managerial function concerned with implementation, improvement, and control of flows and storage of goods, services, and related information from point of origin to point of consumption. The Council of Logistics Management (1998) equally defined logistics management as the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.

Guided by the above definitions this study conceptualized logistics management system to include three indicators of Logistics activities, inventory management and communication and is defined in the next paragraphs.

Logistics activities/services

Logistics activities or services according to the council of logistics management include key and support activities. A key logistics activity is transportation: concerned with mode and transport services selection, freight consolidation, carrier routing, vehicle scheduling, equipment selection, claims processing, rate auditing. Related support activities/services include warehousing which involves space determination, stock layout and dock design, warehouse configuration, stock placement. The second support activity is material handling concerned with equipment selection, equipment replacement policies, order picking policies, stock storage and retrieval. Other support services include packaging and information flow management. This study

borrowed from the above comprehensive definition of logistics activities and conceptualizes logistics services/activities to the key service of transportation and two support services of storage and distribution services.

Inventory management system

Inventory management involves creating an inventory plan that will ensure that items are available when they are needed and keeping track of existing inventory and its use through overseeing and controlling of the ordering, storage and use of inventory through use of appropriate inventory systems and inventory replenishment approaches (Baker, 2007).

Malakooti (2013) defines an inventory system as the organizational structure and the operating policies for maintaining and controlling goods to be stocked. The system is responsible for ordering and receipt of goods, timing the order placement and keeping track of what has been ordered, how much, and from whom. The system also must follow up to ensure receipt of orders by the suppliers, correct due dates, and compliance to re-ordering procedures and return of rejected inventory. Two inventory systems are widely recognized, thus the a one-time purchasing decision also known as the single-period system and a multi-period inventory system which uses two models namely the fixed order quantity model used to maintain an item "in-stock," and when a certain number of units must be ordered each time. Inventory for the item is monitored until it gets down to a level where the risk of stocking out is great enough that we are compelled to order. The fixed time period system is used when the item should be in-stock and ready to use. In this case, rather than monitoring the inventory level and ordering when the level gets down to a critical quantity, the item is ordered at certain intervals of time. This is often convenient when a group of items is ordered together.

Simchi-Levi *et al.* (2008) identifies two inventory replenishment approaches thus push and pull approaches. Push-based supply chain makes production and distribution decisions according to long-term forecasts based on orders. Push-based supply chain has a long react time which can lead to the inability to meet changing demand patterns and the product obsolescence or excessive inventories. In a pull-based supply chain production and distribution are coordinated with true customer demand. Efficient information flow about customer demand decreases inventories. Pull system enables lead-time reduction due to better anticipation and decrease in variability (Simchi-Levi *et al.* 2008). Thus, pull system reduces inventories, enhance the ability to manage resources, and reduces system costs compared to equivalent push system. On the other hand, pull system is difficult to implement when lead times are long making reaction to demand information impractical. In pull-based system it is often more difficult to take economic advantage in manufacturing and transportation since they are not planned far ahead in time (Simchi-Levi *et al.* 2008). This study conceptualizes inventory management to include two indicators of inventory system and the replenishment approach in the UPF logistics function and how it affects logistics service quality.

Communication

Communication dimension of logistics management arises from the view that the overarching purpose of the logistics function lies in value creation aimed at supporting firm performance which depends on both frequency of formal and informal contact and ease of access to information necessary to sustain the relationship (Doloi, *et al.*, 2012). Frequent accesses via regular formal or informal contacts between managers across firms have been cited as a critically important element of inter-firm communication (Vargo & Akaka, 2009). According to Doloi *et al.* (2012), communication between supplier and buyer should be bi-directional and

two-way communication to improve the supplier's performance through buyer's feedback. This has been enabled by recent developments where information technology has been widely used to harness customer (Sanders, 2008). This study borrows from the above conceptualization and conceptualizes communication to include internal communication and the efforts to use ICT in the logistics at the UPF.

2.3.2. Logistics Service Quality

Logistics service quality was first defined by Perrault and Russ (1974) from an operational level which refers to delivering the right amount of the right product at the right place at the right time in the right condition at the right price with the right information. Ackerman (1996) however defines logistics service quality with a utility perspective and considers that logistics service level is often measured by the rate of product availability, the rate of order fulfillment, and the rate of the freights in good condition. Mentzer, Gomes and Krapfel (1989) support the above perspective of logistics service quality but notes that the definition of logistics services needed a customers' needs perspective where service quality considers the extent to which the customer's needs are fulfilled and may consists of three dimensions, namely availability, timeliness, quality of physical distribution service. Mentzer et al., (1989) therefore proposed three dimensions of physical distribution service quality based on Mentzer's research, including timeliness, availability, and conditions of goods. The time, availability and conditions of goods indicators of service quality have been widely used as measures of logistics service quality and were adopted in this study as indicators of logistics service quality at the UPF.

2.4. Logistics Activities and Logistics Service Quality

2.4.1. Transportation and logistics service quality

Blecken (2010) while considering the logistics activity of transportation put it that transport which is both national and international, single mode and multi-modal transport has the objective to overcome the spatial separation of point of source and point of demand in an optimal manner. Transport logistics usually include the multi-echelon transportation of goods, from globally distributed warehouses with pre-positioned goods to be deployed in acute emergencies, goods flow through the various stages of the supply chain including the last-mile distribution.

A study conducted by Blecken (2010) found that majority of organisations in the survey stated that they transport goods across international borders along intercontinental transport routes. In many cases, the international transport includes only direct shipments from suppliers to the countries in which the operations are run.

Kumar, et al (2009) noted that because the containers are transported by truck from the port inland the poor road infrastructure into remote areas of Africa makes these logistical efforts cumbersome.

2.4.2. Storage and Logistics Service Quality

Blecken (2010) highlighted that the objective of warehousing is to store goods before they are transported further towards the area of operations, while protecting them from deterioration, damage and theft. Warehousing is also a means of buffering against varying lead times and demand volatility. Except for the pre-positioning of stocks for emergency preparedness, the storage of goods is usually suboptimal, since it involves the use of scarce financial, logistical and personnel resources. These costs,

however, need to be balanced with economies of scale in the long-haul transportation of goods.

Bowersox, et al (2010) assumes that the nature or state of the storage facility has bearing on the quality of logistics and the flow of goods. A store with good and ideal characteristics will offer enough space and condition for better storage of supplies and hence a better delivery of services. Otherwise, if the store is inadequate, this will affect storage of supplies and eventually the quality of logistics and goods supplied since storage is key in the system.

Blecken (2010) study also found that 70 per cent of all organisations store goods centrally, i.e. in the country of operations. Yet, 60 per cent of all organisations also store goods at central warehouses, located mostly in the same country in which headquarters are located. Moreover, a minority of organisations alternatively or even additionally pre-position goods in strategic locations world-wide, in order to respond to any medium-scale emergency within 48 hours.

2.4.3. Distribution and Logistics Service Quality

According to the Council of logistics management (1998), distribution systems are made up of bases and procedures that are designed to process resources from the time they enter the system at the strategic level until they are issued at the tactical level. In order to accomplish its objective, the logistics system must have a place from which to provide resources and distribution procedure for moving the required resources from the base to the tactical forces that need them. Similarly, Zheng and Zhang (2010) notes that distribution logistics is the management activities to pursue customer satisfaction and order fulfillment, connecting the main body of supply and demand, overcoming space and time obstacles to achieve efficient and rapid

movement of goods. It also involves conveying of information related to the distribution of physical goods.

Bowersox et al (2010) contends that there are two forms of designs of distribution logistics with the one being the echeloned structure where warehouses are used to create inventory assortments and consolidation is applied to gain economies of scale while the second design has a direct system which implies that goods are shipped directly to customers' destination. The second option of direct delivery to the consumers is preferred for enhanced logistics service quality if economic conditions allow.

Chopra (2003) however identify six categories of distribution networks (1) Manufacturer storage with direct shipping; (2) Manufacturer storage with direct shipping and in-transit merge; (3) Distributor storage with package carrier delivery; (4) Distributor storage with last mile delivery; (5) Manufacturer/distributor storage with customer pickup; and (6) Retail storage with customer pickup. In categories (1) and (2), the supply points are manufacturers and the demand points are customers. The only difference between these two categories is whether there is a transshipment point between the manufacturer and the customer. The supply points in categories (3) and (4) are distributors (these could be intermediate warehouses) and there are no transshipment points. The two categories provide different delivery options respectively: carrier delivery or last mile delivery. Categories (5) and (6) are relatively unique compared to other categories, which let customers pick up their order either from a manufacturer/distributor or from a retail store.

Langevin, et al (1996) on the other hand categorize the distribution function as one of six types: (1) One-to-many distribution without transshipments; (2) Many-to-one

distribution without transshipments; (3) Many-to-many distribution without transshipments; (4) One-to-many distribution with transshipments; (5) Many-to-many distribution with transshipments; and (6) Integrated networks.

Forslund (2007) examines the interaction between the distribution logistics using a sample of Swedish firms from four of the largest industries and found that order fulfillment process controls the material flow between companies, and performance is critical in order to create customer satisfaction and competitive advantage.

Gaboury (2005) examines a distribution challenge of the last mile problem in a humanitarian context and noted a special problem in supplying food in, such as famine areas is the problem actual distribution to the victims of the disaster. Paulraj and Chen (2007) note that the performance of distribution logistics impacts tremendously on the performance of an entire organization.

In complement, Banomyong and Sopadang (2010) observed that a suitable storage site for aid must be established at the distribution site, so as to ensure a constant supply in reserve at all times.

2.5. Inventory Management and Logistics Service Quality

2.5.1. Inventory System and Service Quality

One of the indicators of inventory system adopted in this study was the single period inventory problem, also known as the newsboy problem. Hadley and Whitin as cited in were the first researchers to introduce the newsboy problem, developing a numerical dynamic programming based approach to solve it. Gallego and Moon defined the newsboy problem as a tool to decide the stock of an item when (1) there is a single purchasing opportunity before the start of the selling period and (2) the demand for the item is random. The classical newsboy model assumes that if the order

quantity is larger than the realized demand, a single discount is used to sell excess inventory or that excess inventory is disposed off. On the other hand, if the order quantity is less than demand, then profit is lost (Ramamurthy, Shanthikumar and Shen, 2012).

Altay, Litteral, Rudisill (2012) examine the use of fixed time period model and note that it has a larger average inventory because it must also protect against stock out during the review period, the fixed-order quantity model has no review period. The fixed order quantity model favors more expensive items because average inventory is lower. The fixed order quantity model is more appropriate for important items such as critical repair parts because there is closer monitoring and therefore quicker response to potential stock out. The fixe order quantity model requires more time to maintain because every addition or withdrawal is logged.

However, Qin and Kar (2013) notes that the single-period inventory system is very significant in terms of both theoretical and practical consideration. In real life, many products have a limited selling period, so newsboy problem provides a very useful framework for making decisions on advanced booking of orders in a number of practical contexts, such as in fashion, sporting and various service industries). It will be in this study's best interest to examine the use of the single period inventory system in UPF and how it has been useful or constrained logistics service quality.

The multi-period inventory system was the second indicator considered in this study and it is widely use since most organizational will purchase inventory at different times. Baldenius and Reichelstein (2005) offered perhaps the most convincing study of the contribution of good inventory management to profitability. They studied inventories of publicly traded American manufacturing companies between 1981 and 2000, and they concluded that firms with abnormally high inventories have

abnormally poor long-term stock returns. Firms with slightly lower than average inventories have good stock returns, but firms with the lowest inventories have only ordinary returns. The study concluded that the ability to incorporate more realistic assumptions about product demand into inventory models is one key factor to profitability. Practical models of inventory would need to address the issue of demand forecasting while staying sufficiently immunized against uncertainty and maintaining tractability.

Waller, Nachtmann and Hunter (2006) research aimed at considering the impact of common inventory system inaccuracies that occur in retail outlets on the inventory levels, fill rate, and service level found that inventory system error and the frequency with which the error is corrected are statistically significant for fill rate and service level. Thus, inaccuracies in inventory levels affect a retail outlet's ability to service its customers, though at the single SKU level, the results do not indicate a practical impact due to countervailing effects. The implications of the study were that retail outlets must be aware that error exists and can influence the behavior of their replenishment systems, but the overall impact may not be as significant.

Tehrani et al(2013) in their study considered a multi-period manufacturer, 1-retailer, newsvendor inventory system with stochastically dependent manufacturing capacities and demonstrated that stochastic dependence in disruptions can have opposite effects on system performance in the multi-source and assembly systems. While risk diversification is preferred in the multi-source system, risk concentration is preferred in the assembly system. The Tehrani *et al.* (2013) study concluded that if the retailer ignores the effect of dependent disruptions, then in the multi-source structure, it would lead to underestimating the cost, overestimating the fill rate, and ordering more

units than the optimum; however, in the assembly structure, the opposite would happen.

2.5.2. Inventory Replenishment System and Logistics Service Quality

There are many inventory pull inventory replenishment initiatives for time-based purchasing strategies inspired by JIT philosophy such as quick response (QR), efficient consumer response (ECR), and continuous replenishment (CR). All these inventory techniques use pull philosophy and information to minimize buffers (Affonso et al., 2008). The idea of QR is to capture demand as close to real-time as possible and as close to the final consumer as possible. In a QR system suppliers receive point of sale (POS) data to synchronize production and inventory activities with actual sales at the retailer. The retailer still places individual orders but POS data is used to improve forecasting and scheduling, and to reduce lead time (Simchi-Levi et al. 2008).

Rodriguez et al., (2008) in support highlights that QR logistics has become a basis for collaborative working in the supply chain. In the grocery sector this development is called ECR. The principle of ECR is to reduce costs significantly by collaborating in new product introduction, trade and consumer promotions, range and assortment, and product replenishment. In a CR system the resupply of products is automatic due to electronic interface and computer-aided communication. The system should be so efficient and flexible that stocks are replenished continuously without placing orders. The vendors use POS data to prepare shipments at previously agreed-upon intervals and inventory levels defined by the customers. The CR process works best with high-volume items (Blankley, 2008).

On the relationship between VMI and its related outcomes, Kaipia, Holmström & Tanskanen, (2002) reports that through VMI, firms are able to increase

its performance in delivery process. A study that was conducted at a grocery manufacturer and a retailer in Finland, has provided an important finding about the benefit of implementing VMI in the area of ability to adapt in demand variability, while at the same time meeting all delivery date. For firms that implement the VMI, they have gained lower delivery and administration costs for its business and this will allow firms to translate this cost savings to end customer.

Kang and Kim (2010) reports of a case where implementation of VMI programs can lead to significant stock reduction up to 30 per cent in pharmaceutical products, as described by and other benefits. Through VMI, the flow of information and, as result, the flow of materials become seamless, improving service levels, inventory and transportation costs, the coordination of supply process and transport optimization. Galbreth, Hill and Handley (2008) equally report that a well-engineered VMI system offers several benefits for both the supplier and customer. It also benefits the entire demand-supply chain by reducing costs and improving responsiveness advantages of VMI include reduced administration cost, Improved service level and availability, less stock-outs, Assured for critical needs, lower inventories, lower need of storage space, improved cash flow, specialist expertise.

Perera et al. (2009) survey of 265 UK hospitals identifies a number of further factors for efficient inventory management by using t-tests to evaluate differences in inventory and wastage levels, and comparing hospitals that apply certain practices with hospitals not doing so. The research showed that reducing the reservation period for assigned inventory leads to lower inventory levels and reduced wastage.

2.6. Communication and Logistics Service Quality

2.6.1. Internal Communication and Logistics Service Quality

Communication according to Goodman (2006) is the term used to describe a variety of strategic management functions and includes among others public relations; crisis and emergency communication; corporate citizenship; reputation management; community relations; media relations; investor relations; employee relations; government relations; marketing communication; management communication; corporate branding and image building; advertising. Corporations use it to lead, motivate, persuade, and inform employees and the public as well.

Bowersox, et al. (2010) noted that in a systemic approach, supply chain can also be considered as a network of systems, sub-systems, operations, activities, and their relationships, where the members of the chain are: suppliers, transporters, manufacturing plants, distribution centers, retailers and construction co- and sub-contractors. Constangioara (2013) examines the contribution of communication the supply chain to overall organizational performance and found that information management and internal communication accounts for the innovational performance.

2.6.2. ICT and Logistics Service Quality

On the relationship between ICT and Logistics services quality, Fin (2006) investigated the relation between EDI in apparel industry and three performance levels: operational, financial and strategic. This helped in reduction of lead time from several weeks to 3 days. Devaraj et al. (2007) analyzed the relationship between supplier integration and customer integration with supply chain performance when supported by e-business technologies. E-business capability supporting supply chain

technologies such as customer orders, procurement and collaboration between suppliers and customer enhances the production information integration intensity, which in turn improves the supply chain performance.

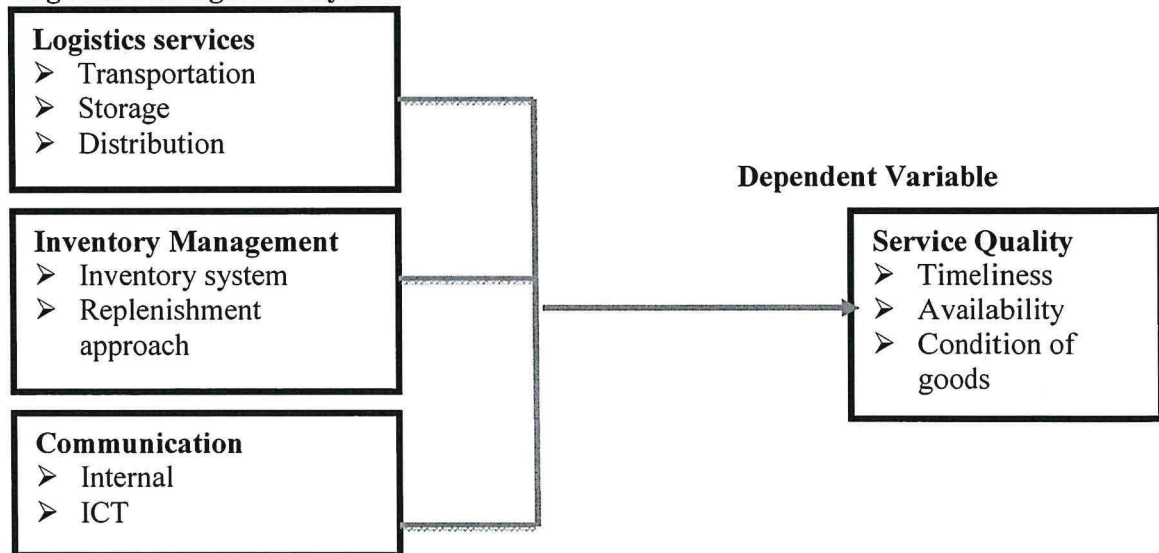
Shatat and Udin (2012) study equally reports of a positive and significant relationship between ERP system such as integration, material management, production planning, and controlling, and SCM performance. The findings of this study imply that the successful implementation and the effective usage of ERP system can contribute toward enhancing supply chain management performance in many ways such as, integration of internal business processes, enhancement of information flow among different departments inside the company, improvement of the company's relationships and collaboration with outsourcing suppliers, customers, and supply chain partners.

2.7. Conceptual framework

The model in figure 1 below shows the relationship between Logistics management system that is the independent variable and service quality (dependent variable).

Independent variable

Logistics Management System



Source: model adopted from Nyanchama and Mwangangi (2014) and Kitaka (2007), merged and modified by the Researcher.

The model shows that logistics service quality depends on the logistics management system. Logistics service quality has three indicators of timeliness of the required goods, services and information; availability of goods which denoted absence of stock outs, and conditions of goods which denotes the quality or suitability of goods received at the point of consumption.

Logistics management system has three dimensions of logistics services, inventory management and communication. Logistics services have included three indicators of transportation, storage and distribution to the point of consumption. Inventory management has three indicators of inventory system used in making inventory decisions (single or multiple system), and inventory replacement approach (push and pull system) for specific inventories. Communication has two indicators of internal communication that is top-down and bottom up within the logistics function and other related functions. It also has the indicator of use of modern ICT.

It is therefore hypothesized that logistics activities significantly affect the logistics services, inventory management, and communication respectively, influence Logistics service quality in the UPF.

2.8. Summary of Literature Review

The review of existing literature offer scanty literature on the influence of logistics services/activities of transportation, storage and distribution on Logistics service quality in the public sector and specifically in police logistics. Similarly, there was a dearth of literature on the extent to which inventory management systems have influenced logistics service quality in the police yet there was no conclusive position on the extent to which communication aspect of logistics management has influenced logistics service quality. This study strived to cover the raised literature gaps by providing empirical evidence on the relationship between logistics management dimensions of logistics services, inventory management and communication system and LSQ in UPF.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section presents the research method that was used to carry out the study. It covers the research design, target population, sample size and technique, data collection methods and instruments, validity and reliability, measurement of variables and data analysis.

3.2 Research Design

A research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way (Denscombe, 2003). The study used a cross sectional design adopting quantitative and qualitative approaches. The cross-sectional approach was used because issues of logistics management and logistics service quality were to be examined at that point in time (Amin, 2005). The quantitative approach was used to quantify and establish the relationships and test hypotheses while the qualitative approach would help gain in-depth explanations on the logistics management systems in UPF.

3.3. Study Population

The study was conducted in all police stations in the regions where the police operate in Uganda. According to the logistics records, the logistics function involves a total of 118 staff working as logistics and store personnel and receiving committees consisting of 4 members at each regional store in the 10 regions. This study therefore considered a population of 118 respondents who interact with dry food rations logistics.

3.4. Sample Size and procedure

The study sampled 106 respondents based on Krejcie and Morgan (1970) sampling guidelines a detailed in table 1 below.

Table 1: Population category and sample size

Category	Population	Sample	Sampling technique
Logistics personnel	35	32	Multistage
Stores personnel (8 head office + 20 regional)	43	38	Multistage
Receiving committee members (4members per region X 10)	40	36	Multistage
Total	118	106	

3.5. Sampling Technique

This study used multi stage sampling (Amin, 2005) that involved considerations of the 10 police regions in Uganda. The second stage included consideration of one sub region in each region. The third stage included considerations of the regional store in the sub region to represent the region from which the logistics, stores and receiving committee at that store were considered for administration of the questionnaire.

3.6. Data Collection Methods

The study used a survey approach where both qualitative and quantitative data was collected using a questionnaire and interviewing.

3.6.1. Questionnaire Survey Method

The questionnaire was used to collect primary data from the selected respondents by personally delivering them to the respondents. The questionnaire was issued to 106 respondents in their different categories where the respondents record their answers within closely defined alternatives. The study used a questionnaire of gain perception

of logistics management system and LSQ. The questionnaire was also used because it is less expensive for data collection (Denscombe, 2003).

3.6.2. Interview method

Interviewing collection was used to enable gaining of in-depth information from the targeted respondent through forms of face to face conversations and probing of the respondent's responses to gain detailed explanations on logistics management and LSQ as suggested by Sekeran (2003). The study specifically interviewed the Officer in Charge of food logistics.

3.7. Data Collection Instruments

3.7.1. Self-administered Questionnaire

The study used a close-ended self-administered questionnaire divided into sections of background information, logistics system, and LSQ. A standard Questionnaire on a five point Likert scale of 5- Strongly Agree; 4- Agree; 3- Not Sure; 2- Disagree; 1- Strongly Disagree was used to get quantifiable primary data from individual respondents because items with five levels may produce slightly higher mean scores relative to the highest possible attainable score compared to those produced from the use of other levels (see appendix 1).

3.7.2. Interview guide

Interview schedule was semi structured focusing on areas of Logistics system and LSQ in the UPF (see appendix II).

3.8. Validity and Reliability

3.8.1. Validity

The validity of the instrument was tested using the Content Validity Index. This involved judges scoring the relevance of the questions in the instruments in relation to

The Content Validity Index (CVI) was arrived at using Nunnally and Bernstein (1994) formula:

$$\text{CVI} = \frac{\text{Total number of items declare valid}}{\text{Total number of items}}$$

Total number of items

Table 2: Content Validity Index results

Variable	Total Number of items	Number of items declare valid	CVI
Logistics services	9	7	0.889
Inventory management	6	5	0.833
Logistics communication	6	5	0.833
Service quality	10	8	0.800

Source: Expert Judgment

Table 2 shows that Logistics services yielded CVI of 0.889, inventory management yielded a CVI of 0.833, logistics communication yielded a CVI of 0.833 and service quality yielded CVI of 0.800. Since all variable yielded a CVI above 0.70 accepted for social sciences, it was concluded that the instrument had a good validity hence relevant in measuring dry food rations logistics management and service quality in the UPF.

3.8.2. Reliability

The study questionnaire pretested for its reliability on a sample of 10 respondents to examine individual questions as well as the whole questionnaire very carefully (Nunnally and Bernstein, 1994). Reliability measures the consistence of the instrument in measuring what it is supposed to measure (Nunnally and Bernstein, 1994). In this study a Cronbach's alpha coefficient was computed to show how reliable the data is using Software Package for Social Sciences (SPSS) taking only variables scoring above 0.50 as suggested by Nunnally and Bernstein (1994) and the findings are presented below.

Table 3: Reliability Results

Variable	Cronbach's Alpha	N of Items
Logistics services	.866	9
Inventory management	.713	6
Communication	.791	6
LSQ	.818	10

Source: Primary data

Table 3 above shows that logistics services yielded Cronbach's alpha value of 0.866, inventory management yielded Cronbach's alpha value 0.713, communication yielded alpha value of 0.791 while LSQ yielded alpha value of 0.818. Since all variables yielded Cronbach's alpha values above the alpha value of 0.70 accepted for social sciences, it was concluded that the instrument was reliable, thus consistent in measuring logistics systems and service quality in the UPF.

3.9. Data collection procedure

After successful defense of the proposal, an introductory letter from Kyambogo University was used to seek permission to conduct the study in the UPF. Anonymity and confidentiality of the respondents was observed by not asking the respondents to put their names on the questionnaires.

3.10. Data Analysis

3.10.1. Quantitative Analysis

Quantitative data was analyzed using descriptive and inferential statistics that include frequency and percentage, mean and standard deviations for each of the variables used in the study.

Pearson's correlation statistics was used to test the relationships at 99 and 95 confidence limits. A positive correlation indicates a direct positive relationship between the variables while a negative correlation indicates an inverse, negative relationship between the two variables.

A regression analysis using ANOVA statistics of adjusted R^2 values, beta, t values and significance values as suggested by Amin (2005) was used to determine the extent to which Logistics management system influences LSQ.

3.10.2. Qualitative Analysis

The study used the content analysis technique to analyze qualitative data where themes identified in the respondent's narratives on logistics management were analyzed for their implications, inferences and conclusions. Further qualitative analysis involved comparing the qualitative data with the quantitative findings.

3.11. Measurement of Variables

The variables were measured by operationally defining concepts. For instance the questionnaire was designed to ask responses about logistics management based on Lyson and Farrigham (2009) guidelines while LSQ was measured based on Mentzer et al (1989) measures. These were channeled into observable and measureable elements to enable the development of an index of the concept. A five- Likert scale namely: 5-Strongly agree; 4- Agree; 3- Not sure; 2- Disagree; 1- Strongly disagrees was used to measure both the independent and dependent variables.

3.12. Ethical Considerations

As part of the ethical considerations, the study used an introductory letter from Kyambogo University to seek permission to conduct the study. The respondents were asked to indicate their names on the questionnaire. The final report was defended before a panel constituted by Kyambogo University and also be presented for approval and adoption of recommendations by the UPF logistics top management.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.1. Introduction

This chapter presents analyses and interprets the study findings of logistics system and LSQ in UPF based on the information obtained from the study questionnaire and interviews. This chapter presents the response rate, background information about the respondents and empirical findings on logistics service, inventory management, communication and LSQ. A multiple regression analysis is presented.

4.2. Response Rate

A total of 106 questionnaires were issued but 80 usable questionnaires were returned in time for consideration in the study giving a response rate of 75%. Amin (2005) contends that a response rate of 40% and above is a good representation of the study sample selected from the study population. This study response rate of 75% suggests that 8 in very 10 respondent responded to the study which is a high representation of the study population from which the sample was selected.

4.3. Background Information about the Respondents

This sub section presents the background of the respondents used in the study in relation to the level of education, position, time worked with the logistics function in UPF and the region.

Table 4: Background information about the respondents

Item	Description	Freq	%
Highest level of education	Diploma	12	15.0
	Degree	56	70.0
	Professional	4	5.0
	Masters	8	10.0
	Total	80	100.0
Position in relation to the logistics function	Logistics team	15	18.3
	Stores	25	31.2
	Receiving committees	30	37.5
	Total	80	100.0
Time worked with police logistics function	< 5 years	8	10.0
	5-10Years	52	65.0
	1-15 Years	20	25.0
	Total	80	100.0
Region	Kampala Metropolitan	18	22.5
	Central	13	16.2
	Western	9	11.2
	Northern	16	20.0
	Eastern	24	30.0
	Total	80	100.0

Source: Primary data

Table 4 above shows that majority of 70% of the respondents were degree holders, 15% were diploma holders, 10% had attained a master degree as their highest level of education. A total of 5% had professional qualifications such as nutritionists. The implication was that the respondents had attained a good level of education to understand logistics management systems in the UPF and how it influences LSQ in the force by virtue of their fairly high education.

In relation to the logistics function, majority of 18.3% were from the logistics team, 37.5% were receiving committee members while 31.2% were stores staff. The implication was data was collected from staff who were directly involved in the UPF

logistics operations as logistics officers who plan and implement logistics systems, stores staff who manage the stores and receiving committees who verify received dry food rations. These are deemed to possess adequate experiences on logistics systems and LSQ in the force.

In relation to the time worked with police logistics function, majority of 65% had worked for 5-10 years, while 25% had worked for 10-15 years and 10% had worked for less than 5 years. These findings suggested that the respondents had accumulated adequate experience in the UPF logistics systems and LSQ given the fairly high tenure with the UPF logistics function.

Table 4 above further shows that a total of 30% of respondents were from Eastern region, 22.5% were from Kampala metropolitan area, 20% were from northern region, 16.2% were from central region and 11.2% were from the western region. The findings suggest that data collected is representative of all regions of Uganda where UPF operates and therefore representative of a national status on logistics management and LSQ in the force.

4.4. Logistics Services and LSQ

The first objective of the study was to establish the relationship between the logistics services and LSQ. Logistic services according to the conceptual framework had indicators of transport, storage and distribution services measured using 9 items scored on a five point Likert scale ranging from 5= Strongly Agreed, 4= Agree, 3= Not Sure, 2= Disagree, 1= Strongly Disagree and the findings are presented in Table below.

Table 5: Descriptive results for Logistics system

	Response	Freq	%	Mean	Std. Dev
<i>Transport</i>					
1. The UPF has appropriate transport facilities which have ensured timely delivery of dry food rations to the different regional stores	Strongly disagree	24	30.0	2.35	1.244
	Disagree	28	35.0		
	Not Sure	8	10.0		
	Agree	16	20.0		
	Strongly agree	4	5.0		
2. The UPF transport facilities have ensured availability of dry food rations to the different regional stores	Strongly disagree	28	35.0	2.20	1.257
	Disagree	32	40.0		
	Agree	16	20.0		
	Strongly agree	4	5.0		
3. The UPF has appropriate transportation facilities for delivery of dry food rations in good condition	Strongly disagree	24	30.0	2.10	1.001
	Disagree	36	45.0		
	Not sure	8	10.0		
	Agree	12	15.0		
<i>Storage</i>					
4. The UPF stores have facilitated timely deliveries of dry food rations to the users	Strongly disagree	28	35.0	2.15	1.202
	Disagree	32	40.0		
	Not sure	4	5.0		
	Agree	12	15.0		
	Strongly agree	4	5.0		
5. The UPF stores have facilitated availability of dry food rations to the users	Strongly disagree	36	45.0	2.45	1.168
	Disagree	24	30.0		
	Not sure	4	5.0		
	Agree	12	15.0		
	Strongly agree	4	5.0		
6. The UPF stores have enable delivery of dry food rations in good conditions	Strongly disagree	8	10.0	3.25	1.419
	Disagree	28	35.0		
	Agree	24	30.0		
	Strongly agree	20	25.0		
<i>Distribution</i>					
7. The dry food rations distribution mechanism has enabled timely delivery of dry food rations to the users	Strongly agree	28	35.0	2.16	1.202
	Disagree	32	40.0		
	Not sure	4	5.0		
	Agree	12	15.0		
	Strongly agree	4	5.0		
8. The dry food rations distribution mechanism has enabled availability to the users	Strongly disagree	20	25.0	2.35	1.159
	Disagree	32	40.0		
	Not sure	12	15.0		
	Agree	12	15.0		
	Strongly agree	4	5.0		
9. The dry food rations distribution process has enabled delivery to the users in good conditions	Strongly disagree	20	25.0	2.05	.926
	Disagree	44	55.0		
	Not sure	12	15.0		
	Strongly agree	4	5.0		

Source: Primary data

Table 5 above shows that the majority of 65% of the respondents disagree (mean = 2.35) that UPF had appropriate transport facilities, which ensured timely deliveries while another 75% disagreed with transport facilities facilitating availability of dry food rations (mean = 2.20) and delivery of dry food rations in good condition (mean = 2.21) to the regional stores. The findings suggested that about 7 in every 10 logistics stakeholder was dissatisfied with the transport logistics used in the delivery of dry food rations. The implication was that the logistics function in UPF was constrained by inappropriate transport facilities for distribution to the regional stores leading to late deliveries and stock outs.

Asked to explain the challenges with the transport logistics in UPF, the logistics manager interviewed noted:

Logistics especially for dry food rations has no dedicated fleet as the transport and mechanical division of the force manage fleet. There is a shortage of trucks with high tonnage to transport dry food rations to the regional stores and from the stores to the point of consumption. Even when make schedules and submit them to the transport section, our schedules are not promptly reconciled with the transport section. This practice has led to delays in delivery of consignments to the regional stores.

Table 5 above also shows that the majority 75% of the respondents disagreed (mean 2.15) with the UPF stores facilitating timely deliveries and ensuring availability (mean = 2.45). Majority of 55% agreed with stores facilitating maintenance of dry food rations in good conditions (mean = 3.25). The finding suggested that about 8/10 logistics stakeholders were not satisfied with storage facilities in the UPF. The implication was that although central and regional stores could store dry food rations in good conditions, they were small to receive good volumes of deliveries to and ensure availability of stock. This study observation is supported by the interview with the logistics managers who noted that:

“There is a general problem of storage space in the Uganda police force. The regional and station store for dry food rations are generally small and in some case the size of a uniport”.

Asked on distribution system, majority of 75% disagreed (mean = 2.16) that the dry food rations distribution mechanism enabled timely delivery of dry food rations to the users. Another majority of 65% disagreed (mean = 2.35) with the distribution mechanism enabling availability of dry food rations to the users. a majority of 80% of the respondents disagree (mean = 2.05) with the distribution process enabling delivery of dry food rations to the users in good conditions. The implication was that about 7 in every 10 dry food rations logistics stakeholder were not satisfied with the distribution mechanism due to its significant inefficiencies which lead to late deliveries, stock outs and affected condition of deliveries.

Asked to describe the experiences with the distribution mechanisms, the logistics managers interviewed had this to say:

Whereas the logistic unit may strive to get trucks for delivery to the regional stores, there are no trucks for last mile distribution. Officers resort to using public means including motorcycles, which expose the food to rain and dust. DPCs may have access to only one vehicle to conduct all the policing in the districts that distribution of dry food rations may not be a priority. There is preference between the regional stores and point of consumption by our very own officers a vice that has led to shortages in numerous outposts.

4.4.1. Correlation analysis between logistics services and LSQ

To test if there was a significant relationship between logistics services and LSQ a correlation analysis was conducted using Pearson’s correlation coefficient and significance statistics and the findings are presented in Table below.

Table 6: Correlation Matrix between Logistics Services and LSQ

		Logistics services	Service Quality
Logistics services	Pearson Correlation	1	
	Sig. (2-tailed)		
Logistics Service Quality	Pearson Correlation	.798**	1
	Sig. (2-tailed)	.000	

Source: Primary data

P \leq 0.05

Table 6 above shows the Pearson's correlation coefficient $r = 0.798^{**}$ between logistics services and LSQ suggesting that the two variables had a positive significant relationship. The $r = 0.798^{**}$ and significance $p = 0.000$ between logistics services and LSQ suggests that there was a high positive and significant relationship between logistics services and LSQ. The Logistics managerial implication was that achievement of desired level of timeliness, availability and condition of dry food rations depends on the how well the transport, storage and distribution services are well managed in the UPF. Inadequately consideration of transport, storage and distribution logistics adversely affects LSQ for dry food rations in the forces. There was need by management to address the transport, storage and distribution gaps for enhanced LSQ in the force.

4.5. Inventory Management and LSQ

The second objective of the study was to establish the relationship between inventory management and LSQ. Inventory management according to the conceptual framework had two indicators of inventory system and replenishment method measured using 6 items scored on a five point Likert scale ranging from 5= Strongly Agreed, 4= Agree, 3= Not Sure, 2= Disagree, 1= Strongly Disagree and the findings are presented in Table below.

Table 7: Descriptive results for Inventory management

	Response	Freq	%	Mean	Std. Dev
<i>Inventory system</i>					
1. Using the a fixed order quantity for dry food rations has facilitated timely delivery of dry food rations to users in UPF	Strongly disagree	28	35.0	2.25	1.227
	Disagree	24	30.0		
	Not Sure	12	15.0		
	Agree	12	15.0		
	Strongly agree	4	5.0		
2. Using the a fixed order quantity for dry food rations has facilitated availability of dry food rations to users in UPF	Strongly disagree	28	35.0	2.15	1.115
	Disagree	24	30.0		
	Not sure	20	25.0		
	Agree	4	5.0		
	Strongly agree	4	5.0		
3. Using the a fixed order quantity for dry food rations has facilitated dry food rations to users in good conditions	Strongly disagree	20	25.0	2.05	1.069
	Disagree	44	55.0		
	Not sure	4	5.0		
	Agree	8	10.0		
	Strongly gree	4	5.0		
<i>Replenishment method</i>					
4. Using actual demand for dry food rations has facilitated timely delivery of dry food rations to users	Disagree	8	10.0	4.20	.894
	Not sure	4	5.0		
	Agree	40	50.0		
	Strongly agree	28	35.0		
5. Using actual demand for dry food rations has facilitated availability of dry food rations to users	Disagree	12	15.0	4.11	1.001
	Agree	36	45.0		
	Strongly agree	32	40.0		
6. Using actual demand for dry food rations has facilitated delivery of dry food rations in good conditions for consumption	Strongly disagree	4	5.0	4.10	1.051
	Disagree	4	5.0		
	Not sure	4	5.0		
	Agree	36	45.0		
	Strongly agree	32	40.0		

Source: Primary data

Table 7 above shows that majority of 65% of the respondents disagreed that using the a fixed order quantity for dry food rations facilitated timely delivery (mean = 2.25) and availability (mean = 2.15) of dry food rations to users in UPF. A majority of 80% of the respondents disagreed (mean = 2.05) that using a fixed order quantity for dry food rations facilitated delivery of dry food rations to users in good conditions. The

implication was that about 7 in every 10 stakeholders in the dry food rations logistics were not satisfied with the use of fixed order quantity model in inventory management as it lead to late deliveries and stock outs. It was necessary that management consider the use of a blend of single period inventory system for some dry food rations whose demand is constant alongside the multi-period system of EOQ. A majority of 85% of the respondents agreed that using actual demand for dry food rations replenishment has facilitated timely delivery (mean = 4.21) and availability (mean = 4.11) of the dry food rations to users and in good conditions (mean = 4.10). The implication was that use of pull inventory method of actual demand for replenishment of dry food rations was more responsive to meeting time, availability and conditions of suppliers. Its use with other relevant JIT modern approaches of quick response, efficient customer response and continuous replenishment methods would go a long way in enhancing LSQ.

Asked to describe the challenges in inventory management, the Logistics manager noted:

“We always experience delayed payments to suppliers which has resulted into arrears, also suppliers deliberately refuse to deliver items given to them claiming that they haven't received their payments for the past deliveries”.

4.5.1. Correlation analysis between inventory management and LSQ

To test if there was a significant relationship between inventory management and LSQ a correlation analysis was conducted using Pearson's correlation coefficient and significance statistics and the findings are presented in Table below.

Table 8: Correlation Matrix between inventory management and LSQ

		Inventory Management	Logistics Service Quality
Inventory Management	Pearson Correlation	1	
	Sig. (2-tailed)		
Logistics Service Quality	Pearson Correlation	.688**	1
	Sig. (2-tailed)	.000	

Source: Primary data

$P \leq 0.05$

Table 8 above shows the Pearson's correlation coefficient $r = 0.688^{**}$ between inventory management and LSQ suggesting that the two variables had a positive significant relationship. The $r = 0.688^{**}$ and significance $p = 0.000$ between inventory management and LSQ suggests that there was a high positive and significant relationship between inventory management and LSQ. The Logistics managerial implication was that achievement of the desired level of timeliness, availability and condition of dry food rations in the UPF depends on use of appropriate inventory systems and replenishment methods. Inadequately consideration of alternative inventory management system and replenishment methods adversely affects dry food rations LSQ in the forces. There was need by management to address the inventory management gaps for enhanced LSQ in the force.

4.6. Logistics Communication and LSQ

The third objective of the study was to establish the relationship between logistics communication and LSQ. Communication according to the conceptual framework had two indicators of internal communication and use of ICT measured using 6 items scored on a five point Likert scale ranging from 5= Strongly Agreed, 4= Agree, 3=

Not Sure, 2= Disagree, 1= Strongly Disagree and the findings are presented in Table below.

Table 9: Descriptive results for communications

	Response	Freq	%	Mean	Std. Dev
<i>Internal communication</i>					
1. Logistics internal communication has helped ensure that dry food rations supplies are delivered on time	Strongly disagree	4	5.0	4.09	.996
	Disagree	4	5.0		
	Not Sure	4	5.0		
	Agree	40	50.0		
	Strongly agree	28	35.0		
2. Logistics internal communication has helped facilitate availability of dry food rations supplies	Strongly disagree	4	5.0	4.25	.948
	Disagree	4	5.0		
	Not sure	3	4.0		
	Agree	36	45.0		
	Strongly agree	33	41.0		
3. Logistics internal communication has helped ensure that dry food rations supplies are in good conditions	Strongly disagree	4	5.0	4.30	.960
	Disagree	4	5.0		
	Agree	32	40.0		
	Strongly agree	40	50.0		
<i>ICT</i>					
4. UPF uses modern ICT which has ensured timely deliveries of dry food rations	Strongly disagree	43	54.0	2.19	1.181
	Disagree	24	30.0		
	Not sure	4	5.0		
	Agree	4	5.0		
	Strongly agree	4	5.0		
5. UPF uses modern ICT which has ensured availability of dry food rations	Strongly disagree	44	55.0	2.34	1.136
	Disagree	24	30.0		
	Agree	8	10.0		
	Strongly agree	4	5.0		
6. UPF uses modern ICT which has ensured deliveries of dry food rations are in good conditions	Strongly disagree	44	55.0	2.13	.973
	Disagree	24	30.0		
	Agree	8	10.0		
	Strongly agree	4	5.0		

Source: Primary data

Table above shows that majority of 85% of the respondents agreed that logistics internal communication has helped ensure that dry food rations supplies are delivered on time (mean = 4.09), helped facilitate availability of dry food rations supplies (mean

= 4.25) while 90% agreed that it helped ensure that good conditions of dry food rations supplies (mean = 4.25). These results suggested that about 9 in every 10 logistics stakeholder were satisfied with the level of top down and bottom up internal gathering and sharing of logistics information in the UPF logistics function. This should be commended as it enhances the timeliness, availability and condition of suppliers to the intended users.

A majority of 90% of the respondents however disagreed with UPF using modern ICT to and it fostering of timely deliveries (mean = 2.19), availability (mean = 2.34) and condition (mean = 2.13) of dry food rations. This finding revealed low use of modern ICT which may constrain the gathering and sharing information necessary for logistics decision making. It was necessary that management undertake to promote the use of modern ICT for enhanced LSQ in the force.

Asked on the challenges of logistics communication n UPF, the logistics manager observed:

There is a poor communication networks which makes it difficult to coordinate. Feedback from the end user is shared through the logistics officers which makes it difficult for the administration to the truth as complaints do not reach the top management There no communication equipment provided to the logistics division which leave the personnel to only rely on their cellphones which are not reliable as some times phones are switched off.

4.6.1. Correlation analysis between Logistics communication and LSQ

To test if there was a significant relationship between logistics communication and LSQ a correlation analysis was conducted using Pearson's correlation coefficient and significance statistics and the findings are presented in Table below.

Table 10: Correlation Matrix between logistics communication and LSQ

		Logistics communication	Logistics Service Quality
Logistics communication	Pearson Correlation	1	
	Sig. (2-tailed)		
Logistics Service Quality	Pearson Correlation	.389**	1
	Sig. (2-tailed)	.000	

Source: Primary data
 $P \leq 0.05$

Table 8 above shows the Pearson's correlation coefficient $r = 0.389^{**}$ between logistics communication and LSQ suggesting that the two variables had a positive significant relationship. The $r = 0.389^{**}$ and significance $p = 0.000$ between logistics communication and LSQ suggests that there was a high positive and significant relationship between logistics communication and LSQ. The Logistics managerial implication was that achievement of the desired level of timeliness, availability and condition of dry food rations in the UPF depends on use of adequate internal communication by sharing information and the use of modern ICT. Poor internal communication and the failure to use modern ICT adversely affect dry food rations LSQ in the forces. There was need by management to address the logistics communication gaps for enhanced LSQ in the force.

4.7. Multiple Regression

Multiple regression analysis was conducted to establish the extent to which logistics management systems affect LSQ in UPF and which of the dimensions of logistics services, inventory management, and communication was the most significant predictor of the variance in LSQ. The results of the multiple regression are summarized in table 11 below.

Table 11: Multiple Regression Results between logistics management system and LSQ in UPF.

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.826 ^a	.682	.670	.41348		
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta (β)		
1	(Constant)	1.194	.296		4.029	.000
	Logistics Services	.607	.093	.737	6.560	.000
	Inventory Management	.233	.098	.221	2.388	.019
	Communication	.145	.082	.150	1.762	.050
a. Predictors: (Constant), Communication, Inventory Management, Logistics Services						
b. Dependent Variable: Logistics Service Quality						

P ≤ 0.05

Source: Primary data

Table 11 above shows adjusted R² of 0.670 or 67% that was the variance in the LSQ at UPF explained by logistics services, inventory management, and communication putting into consideration all the variables and the sample size of the study. The remaining variance of 33% is explained by other variables other than logistics management system dimensions used in this study.

The standardized coefficient statistics revealed that logistics serviced was the most significant predictor of the variance in the LSQ at UPF ($\beta=0.737$, $t = 6.560$, $p=0.000$) followed by inventory management ($\beta= 0.221$, $t=2.388$, $p=0.019$). Communication was the least significant predictor of the variance in LSQ ($\beta= 0.150$, $t = 1.762$, $p= 0.050$). The implication was that priority should be given strengthening the logistics services of transport, storage and distribution. Second priority should be given to strengthening the inventory systems and replenishment methods under inventory

management while the third priority should be go to strengthening the internal communication and deployment of logistic related ICT.

Decision on the study hypotheses

The first study hypothesis was that there is a significant relationship between logistics services and LSQ. Based on the standardized coefficient statistics, logistics services yielded a standardized $\beta=0.737$, $t = 6.560$, $p=0.000$ suggesting the logistics services has high significant effect on LSQ. The hypothesis that there is a significant relationship between logistics service and LSQ is therefore qualified.

The second study hypothesis was that there is a significant relationship between inventory management and LSQ. Based on the standardized coefficient statistics, inventory management yielded a standardized $\beta= 0.221$, $t=2.388$, $p=0.019$ suggesting the inventory management had a significant effect on LSQ. The hypothesis that there is a significant relationship between inventory management and LSQ is therefore qualified.

The third study hypothesis was that there is a significant relationship between logistics communication and LSQ. Based on the standardized coefficient statistics, communication yielded a standardized $\beta= 0.150$, $t = 1.762$, $p= 0.050$ suggesting the communication had a significant effect on LSQ. The hypothesis that there is a significant relationship between communication and LSQ is therefore qualified.

CHAPTER FIVE

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the summary, discussions, conclusions and recommendations of the study on logistics system and service quality in UPF. The first section present the summary of the study findings based on the study findings. Discussion, conclusions recommendations, limitations, contributions, and areas for further study follow this.

5.2. Summary of the Study Findings

5.2.1. Logistics Services and Service Quality

On transport services, the study found that the transport facilities used in UPF constrained timely deliveries, availability of dry food rations and delivery of dry food rations in good condition to the regional stores. This was attributed to lack of a dedicated fleet for dry food rations and fleet poor scheduling.

On storage services, the study found that although central and regional stores could store dry food rations in good conditions, they were small to receive good volumes of deliveries to and ensure availability of stock.

On distribution services, the study found that dry food rations logistics stakeholder were not satisfied with the distribution mechanism due to its significant inefficiencies which lead to late deliveries, stock outs and affected condition of deliveries.

The study found a high positive significant relationship between logistics services and LSQ qualifying the hypothesis that there is a significant relationship between logistics service and service quality.

5.2.2. Inventory Management and Service Quality

The study found out that that the use of the fixed order quantity model in inventory management leads to late deliveries and stock outs. The use of pull inventory method

of actual demand for replenishment of dry food rations was more responsive to meeting time, availability and conditions of suppliers.

The study found a high positive significant relationship between inventory management and LSQ qualifying the hypothesis that there is a significant relationship between inventory management and service quality.

5.2.3. Communication and Service Quality

The study found out good internal communication that facilitated timely deliveries and availability of dry food rations in good conditions. The study however found a low inclination to use ICT in the UPF logistics function.

The study found a low positive significant relationship between communication and service quality qualifying the hypothesis that there is a significant relationship between communication and service quality.

5.3. Discussion of the Study Findings

5.3.1. Logistics Services and Service Quality

The study found a positive significant relationship between logistics services and LSQ suggesting that the weaknesses in the transport, storage and distribution adversely affected the timeliness, availability and condition of dry food rations in UPF. These study findings relate to great extent to previous study observations such as Blecken (2010) who noted that single mode and multi-modal transport has the objective to overcome the spatial separation of point of source and point of demand in an optimal manner calling for a multi-echelon transportation of goods. Kumar, et al (2009) equally noted the poor road infrastructure into remote areas of Africa makes transport logistics cumbersome. Blecken (2010) further notes that highlighted that warehousing is vital in the supply chain for storage of goods before they are transported further towards the area of operations, while protecting them from deterioration, damage and

theft. Warehousing is also a means of buffering against varying lead times and demand volatility. In complement, Paulraj and Chen (2007) note that the performance of distribution logistics impacts tremendously on the performance of an entire organization.

This study therefore observed that the weaknesses in the logistics services in UPF constrained the timely, availability and condition of goods in the UPF and there need to address the gaps in transport, storage and distribution services.

5.2.4. Communication and Service Quality

The study found a positive significant relationship between logistics communication and LSQ suggesting that the failure to use ICT in the management of the logistics function adversely affected the timeliness, availability and condition of dry food rations in UPF. These study findings echo Constangioara (2013) study findings which found that information management and internal communication accounts for the innovational performance while Cousins (2005) study on the use of EDI in apparel industry helped in reduction of lead time from several weeks to 3 days. In complement, Devaraj et al. (2007) found that the use of E-business facilitated customer orders, procurement and collaboration between suppliers and customer enhances the production information integration intensity, which in turn improved the supply chain performance. Shatat and Udin (2012) study equally reports of a positive and significant relationship between ERP system such as integration, material management, production planning, and controlling, and SCM performance.

This study therefore inferred that the failure to use ICT for communication in UPF constrained the timely, availability and condition of goods in the UPF and there need to address the logistics communication gaps for enhanced service quality.

5.4. Conclusions of the study

5.4.1. Logistics services and service quality in UPF

The study concluded that the timeliness, availability and condition of dry food rations in the UPF significantly depend on the transport, storage and distribution services. The continued failure to address the transport, storage and distribution gaps in the force adversely affects dry food rations LSQ in the force.

5.4.2. Inventory management and service quality in UPF

The study concluded that the timeliness, availability and condition of dry food rations in the UPF significantly depend on the use of mixed inventory management methods that are responsive to demand. The continued reliance on EOQ adversely affects dry food rations LSQ in the force.

5.4.3. Communication and service quality in UPF

The study concluded that the timeliness, availability and condition of dry food rations in the UPF significantly depend on internal communication and use of ICT. The continued reliance on traditional approaches of communication at the compromise of modern methods of ICT constrains LSQ.

5.5. Recommendations of the Study

5.5.1. Logistics services and service quality in UPF

To enhance the timeliness, availability and condition of dry food rations in the UPF the study recommends that the management of UPF should increase on the logistics budget to enable it acquire a dedicated fleet for national transportation and last mile

distributions. The construction unit should consider building or expanding existing national, regional and station stores.

5.4.2. Inventory management and service quality in UPF

To enhance the timeliness, availability and condition of dry food rations in the UPF, the study recommends that the management of UPF should consider the use of a blend of single period inventory system for some dry food rations whose demand is constant alongside the multi-period system of EOQ. The management should also develop suppliers framework contracts terms which provide for JIT inventory supply quick response, efficient customer response and continuous replenishment, vendor managed inventory methods.

5.5.3. Communication and service quality in UPF

To enhance the timeliness, availability and condition of dry food rations, the study recommends that the management of UPF should consider adoption modern ICT related to EDI, radio frequency, social media, internet and website for online communication.

5.6. Limitations of the Study

The study relied on primary data collected using one questionnaire and interview guide without use of secondary data to effectively triangulate and enhance the data quality logistics system and service quality in UPF.

5.7. Contributions of the Study

The study has helped develop policy and managerial recommendations requiring lobbying for increased budget for logistics fleet acquisition, use of multiple and single period inventory systems as well as JIT inventory replenishment approaches. The study has also recommended adoption of ICT for enhanced LSQ. These if adopted by

UPF will go a long way in enhancing LSQ. Similarly, the study has also helped cover literature gaps by providing empirical evidence on the relationship between logistics systems and LSQ in a public sector entity

5.8. Recommendations for Further Studies

The study found out that Logistics system predicted 67% of the variance in LSQ. Other studies need to examine the extent to which the management of dry food rations procurement and transport function has influenced LSQ in the UPF since they are key inputs to the logistics systems.

REFERENCES

- Ackerman, K. (1996). Pitfalls in logistics partnerships. *International Journal of Physical Distribution and Logistics Management*, 26 (3), 35-3.
- Affonso, R., Marcotte, F., & Grabot, B. (2008). Sales and operations planning: the Supplychain Pillar. *Production Planning & Control* 19 (2), 132–141.
- Agaba, R., & Shipman N. (2007). Public Procurement Reform in Developing Countries: The Ugandan Experience. In G. Piga & K. V. Thai (Eds.), *Advancing Public procurement. Practices, Innovation and Knowledge-Sharing*, 373-391.
- Altay, N., Litteral, L. A., & Rudisill, F. (2012). Effects of correlation on intermittent demand forecasting and stock control. *International Journal of Production Economics*, 135(1), 275-283.
- Amin, M.E. (2005). *Social Science Research: Conception, Methodology and Analysis*. Kampala, Uganda: Makerere University Printers, 256–257.
- Baker, P (2007). An exploratory framework of the role of inventory and warehousing in international supply chains, *The International Journal of Logistics Management*, 18(1), 64 - 80
- Baldenius, T., & Reichelstein S. (2005). Incentives for Efficient Inventory Management: The Role of Historical Cost, *Management Science*, 51 (7).
- Banomyong, R., Sopadang, A., 2010. Using Monte Carlo simulation to refine emergency logistics response models: a case study. *International Journal of Physical Distribution & Logistics Management* 40, 709-721.
- Blankley, A. (2008). A conceptual model for evaluating the financial impact of supply chain management technology investments. *International Journal of Logistics Management* 19 (2), 155–182.
- Blecken, A. (2010). *Humanitarian Logistics - Modeling Supply Chain Processes of Humanitarian Organisations*. Bern, Switzerland: Haupt.
- Bowersox, D. J., Closs, D. J., Cooper, M. B. (2010). *Supply Chain Logistics Management*. New York, US: McGraw-Hill.
- Chang, Y.H. (1998). *Logistical Management*. Hwa-Tai Bookstore Ltd., Taiwan.
- Constangioara, A. (2013). Performance metrics in supply chain management.

- Evidence from Romanian economy. *Amfiteatru Economic*, 33, 130-140.
- Cousins, P. (2005). The alignment of appropriate firm and supply strategies for competitive advantage', *International Journal of Production and Operations Management*, 25(5), 403–28.
- Council of logistics management (1998),
- Denscombe, M. (2003). *The Good Research Guide – for Small Social Research Projects*. 2nd Ed., Open University Press, McGraw-Hill Education, 2003. □
- Devaraj, S., Krajewski, L., and Wei, J.C. (2007). Impact of e-Business technologies on operational performance: The role of production information integration in the supply chain, *Journal of operations management*, 25, 1199-1216
- Doloi, H., Sawhney, A. and Iyer, K.C. (2012). Analyzing factors affecting delay in Indian construction projects. *Internal Journal of Project Management*, 30: 479–489.
- Forslund, H. (2007). The impact of performance management on customers' expected logistics performance, *International Journal of Operations & Production Management*, 27(8), 901 - 918
- Gaboury, J. (2005). Hungry to Serve, *Industrial Engineer*, 37(5), 28-9.
- Galbreth, M.R., Hill, J.A., & Handley, S. (2008). An investigation of the value of cross docking for supply chain management. *Journal of Business Logistics*. 29(1), 225-240.
- Goodman, M.B. (2006). Corporate communication practice and pedagogy at the dawn of the new millennium, *Corporate Communications: An International Journal*, 11(3), 196 – 213
- Jonsson, P. and Mattsson, S. A. (2008). Inventory management practices and their impact on planning performance, *International Journal of Production Research*, 46(7), 1787-812.
- Kang, J-H., and Kim, Y-D. (2010). Coordination of inventory and transportation managements in a two-level supply chain. *International Journal of Production*

Economics, 123(1), 137-145.

- Kaipia, R., Holmström, J. and Tanskanen, K. (2002). VMI: what are you losing if you let your customer place orders *Production Planning & Control*, 13(1), 13-21.
- Kitaka. G. (2007). Describing the quality of logistics and supplies management systems. Kisasi and Kitende Health Centre IIs: Namirembe Diocese Church Uganda.
- Krejcie, R.V. and Morgan, D.W. (1970). Determining sample size for research activities. *Educational & Psychological Measurement*, 30, 607-610.
- Kumar, M., Kee, F.T. and Manshor, A.T. (2009). Determining the Relative Importance of Critical Factors in Delivering Service Quality of Banks, *Business Horizons*, 48(2), 47-54.
- Langevin, A., Mbaraga, P. and Campbell, J.F. (1996) Continuous approximation models in freight distribution: an overview. *Transportation Research*, 30, 163-188.
- Lysons. K and Farrington. B. (2009), "Logistics to Third Party Service Providers." New Delhi: Tata McGraw Hill Publishing Company Limited.
- Malakooti, B. (2013). *Operations and Production Systems with Multiple Objectives*. John Wiley & Sons.
- Mentzer, J.T., Gomes, R., and Krapfel, R. E. (1989). Physical Distribution Service: A Fundamental Marketing Concept, *Journal of the Academy of Marketing Science*, 17, (1), 53-62.
- Nunnally, J. C., and Bernstein, I. H. (1994). *Psychometric theory (3rd ed.)*. New York, NY: McGraw-Hill, Inc.
- Nyaberi, J. N. and Mwangangi, P. (2014). Effects of logistics management practices on organization performance in Kenya: A case of Rift Valley Bottlers Limited in Uasingishu County. *International Journal of Social Sciences and Entrepreneurship*, 1 (12), 458-473.
- Parasuraman, A., Zeithaml, V.A., and Berry, L.L.(1988). 'SERVQUAL: A multiple-

- item scale for measuring consumer perceptions of service quality'. *Journal of Retailing*, 64(1), 12–40.
- Paulraj, A., & Chen, I. J. (2007). Strategic Buyer-Supplier Relationships, Information Technology and External Logistics Integration. *Journal of Supply Chain Management*, 43(2), 2-14. □
- Perera, G., Hyam, C., Taylor, C. and Chapman, J.F. (2009). Hospital blood inventory practice: the factors affecting stock level and wastage, *Transfusion Medicine*, 19, 99-104.
- Perrault, W.D. and Russ, F.A. (1974). Physical distribution service in industrial Purchase decisions, *Journal of Marketing*, 40, 3-10.
- Qin, Z., and Kar, S. (2013). Single-period inventory problem under uncertain environment; *Applied Mathematics and Computation* 219, 9630–9638.
- Ramamurthy, Vivek, J. George Shanthikumar, and Zuo-Jun Max Shen (2012). Inventory policy with parametric demand: Operational statistics, linear correction, and regression. *Production and Operations Management* 21.2, 291–308.
- Rodriguez, R.R., Bas, A.O., Escoto, R.P. and Bru, J.M. (2008). Collaborative forecasting management: fostering creativity within the meta value chain context”, *Supply Chain Management*, 13(5), 366-374.
- Sanders, N.R. (2008). Pattern of information technology use: the impact on buyer-supplier coordination and performance, *Journal of Operations Management*, 26(3), 349-367
- Sekaran, U. (2003). *Research Methodology for Business; A Skill Building Approach*. London: McGraw Hill.
- Shatat, A.S., and Udin, Z.M. (2012). “The relationship between ERP system and supply chain management performance in Malaysian manufacturing companies”, *Journal of Enterprise Information Management*, 25(6), 576-604.
- Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E. (2008). *Designing and managing the supply chain: concepts, strategies, and case studies*. 3rd ed. Mc Graw Hill, New York. 498 p Stank. T.P, Keller. S and Daugherty.
- Tehrani, P., Zhai, Y., and Zhao, Q. (2012). Dynamic pricing under finite space

demand uncertainty: a multi-armed bandit with dependent arms. *International journal of distribution* 15(3), 45-53.

Vargo, S.L., and Akaka, M.A (2009). Service-Dominant Logic as a Foundation for Service Science: *Economic Review*, 15(2):472–484, 1974.

Waller, M. A., Nachtmann, H., and Hunter, J. (2006). Measuring the impact of inaccurate inventory information on a retail outlet, *The International Journal of Logistics Management*, 17(3), 355 - 376

Zheng, L., and Zhang, J. (2010). Research on Green Logistics System Based on Circular Economy. *Asian Social Science*. , 4(7), 376- 348

APPENDICES

APPENDIX I: RESEARCH QUESTIONNAIRE

This questionnaire instrument is to collect data on “**Logistics Management System and service quality for dry food ration in the Uganda police force.**” This is to kindly request you to avail me with the information by ticking the appropriate box in the accompanying questionnaire as it will help me achieve the desired objective of this study. The information will only be used for academic purposes and will be treated with utmost **confidentiality**. The findings of this study can be availed to you upon completion on request.

SECTION A: BACKGROUND INFORMATION (please tick where appropriate)

1. Your highest level of education.

Certificate Diploma Degree

Professional Masters

2. What is your position in the in the Uganda police force in relations to the logistics function?

Logistics team Stores Receiving committee

3. How long have you been in this position?

Less than 5 years 5 to 10 years 11 to 15 years

Above 15 years

4. Your Region: Kampala Metropolitan Central Western
Northern Eastern

SECTION B: LOGISTICS SERVICES

Indicate the extent to which you agree with the following observation on the nature of logistics services in the UPF using a scale of 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
<i>Transportation</i>					
1. The UPF has appropriate transport facilities which have ensured timely delivery of dry food rations to the different regional stores	5	4	3	2	1

2. The UPF transport facilities have ensured availability of dry food rations to the different regional stores	5	4	3	2	1
3. The UPF has appropriate transportation facilities for delivery of dry food rations in good condition	5	4	3	2	1
<i>Storage</i>					
4. The UPF stores have facilitated timely deliveries of dry food rations to the users	5	4	3	2	1
5. The UPF stores have facilitated availability of dry food rations to the users	5	4	3	2	1
6. The UPF stores have enable delivery of dry food rations in good conditions	5	4	3	2	1
<i>Distribution</i>					
7. The dry food rations distribution mechanism has enabled timely delivery of dry food rations to the users	5	4	3	2	1
8. The dry food rations distribution mechanism has enabled availability of dry food rations to the users	5	4	3	2	1
9. The dry food rations distribution process has enabled delivery of dry food rations to the users in good conditions	5	4	3	2	1

SECTION C: INVENTORY MANAGEMENT

Please indicate the extent to which you agree with the following observations on inventory management in the UPF using a scale of 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

Inventory management	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
<i>Inventory system</i>					
1. Using the a fixed order quantity for dry food rations has facilitated timely delivery of dry food rations to users in UPF	5	4	3	2	1
2. Using the a fixed order quantity for dry food rations has facilitated availability of dry food rations to users in UPF	5	4	3	2	1

3. Using the a fixed order quantity for dry food rations has facilitated dry food rations to users in good conditions	5	4	3	2	1
<i>Replenishment method</i>					
4. Using actual demand for dry food rations has facilitated timely delivery of dry food rations to users	5	4	3	2	1
5. Using actual demand for dry food rations has facilitated availability of dry food rations to users	5	4	3	2	1
6. Using actual demand for dry food rations has facilitated delivery of dry food rations in good conditions for consumption	5	4	3	2	1

SECTION D: COMMUNINCATION

Please indicate the extent to which you agree with the following statements concerning communication in the logistics function of UPF using a scale of 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

Description	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Internal Communication					
1. Logistics internal communication has helped ensure that dry food rations supplies are delivered on time	5	4	3	2	1
2. Logistics internal communication has facilitated availability of dry food rations supplies	5	4	3	2	1
3. Logistics internal communication has helped ensure that dry food rations supplies are in good conditions	5	4	3	2	1
ICT					
4. UPF uses modern ICT which has ensured timely deliveries of dry food rations	5	4	3	2	1
5. UPF uses modern ICT which has ensured availability of dry food rations	5	4	3	2	1
6. UPF uses modern ICT which has ensured deliveries of dry food rations are in good conditions	5	4	3	2	1

SECTION F: SERVICE QUALITY

Please indicate the extent to which you agree with the following observations on dry food rations logistics service quality UPF using a scale of 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

Description	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
<i>Timeliness</i>					
1. Time between placing an order and receiving deliveries of dry food rations in UPF within the promised time.	5	4	3	2	1
2. Dry food rations always arrive on the promised date	5	4	3	2	1
3. Partial rations deliveries are subsequently sent in the promised time	5	4	3	2	1
4. Return of defective dry food rations are promptly executed	5	4	3	2	1
<i>Availability</i>					
5. We always have the required dry food rations for consumption	5	4	3	2	1
6. We never experience stock outs due to late deliveries of dry food rations	5	4	3	2	1
7. We always receive all our dry food rations in the expected quantities.	5	4	3	2	1
<i>Condition of dry food rations</i>					
8. We always receive all our dry food rations in the expected quality	5	4	3	2	1
9. We always receive all our dry food rations in good packaging	5	4	3	2	1
10. Generally our dry food rations deliveries reach us when they are in good condition for consumption	5	4	3	2	1

THANK YOU FOR YOUR COOPERATION.

APPENDIX II: INTERVIEW GUIDE

1. Describe the status of the transport services in Uganda police force
2. What are the challenges in the UPF transport service?
3. Describe the status of the dry food rations stores in Uganda police force
4. What are the dry food storage challenges in the UPF
5. What the dry food rations distributions challenges in the UPF
6. Describe the inventory replenishment approach in UPF
7. What are the challenges in using the inventory replenishment approach in the UPF
8. What are you experiences with internal communication in UPF
9. Comment on the use of ICT in the UPF

APPENDIX III: TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size

"S" is sample size.

Krejcie, Robert V., Morgan, Daryle W., "Determining Sample Size for Research Activities", Educational and Psychological Measurement, 1970